CUDA PARTICLE SIMULATOR

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Overview

- The goal is a particle animation
- Exploit the parallel nature of particle systems
- Maximize visual effects while remaining real-time
- Develop a variety of different particle effects
- Allow the system to scale to new data
- Mapping OBJ's to particles then threads

Mapping to the GPU

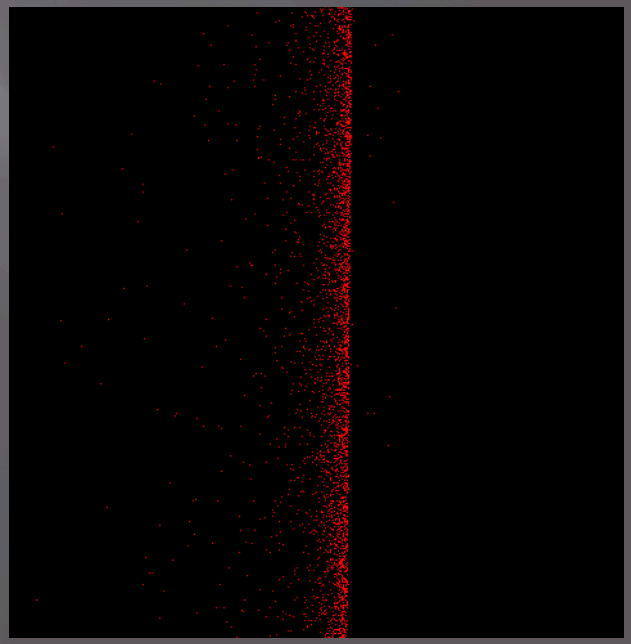
- Establishing maximum particle count
- Dividing particles into blocks
- Assigning threads in each block linearly
- Running the particle update on each thread
- Running as a single dimension
- Communicating with OpenGL

Team Organization

- Build pieces incrementally
- Work using Triple Programming – Avoid Errors
- Finish each piece before progressing

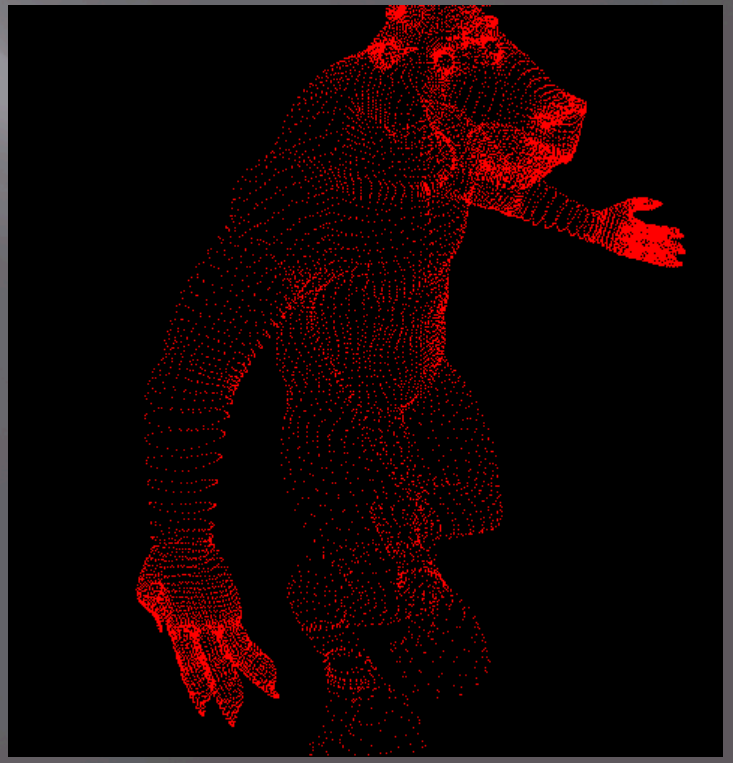
Primary Project Pieces

- ~~Open GL/CUDA~~
- ~~Gravity Forces~~
- ~~Plane Collisions~~
- ~~OBJ Parser + Attraction Forces~~
- Sphere Collisions



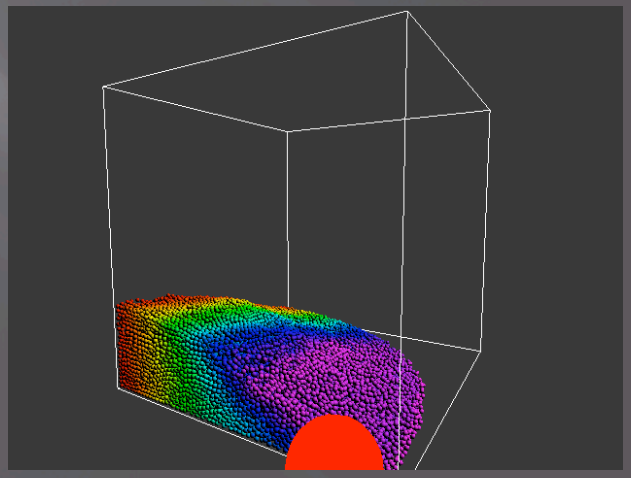
Extra Features

- Vortices
- Spirals
- Motion Blur



Related Work

- "Building a Million Particle System"
  - Presented at Game Developers Conference 2004
  - Sphere collisions and gravity
  - One million particles at 20 frames per second
- Example from CUDA SDK
  - Plane collisions and gravity
  - Inter-particle forces
  - Slow and highly fragile system



QUESTIONS?